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NASA'S EARTH SCIENCE ENTERPRISE STUDIES
CONTINUED APACE TO END 2002 AS THE JPL-
MANAGED SEAWINDS SCATTEROMETER
INSTRUMENT LAUNCHED SUCCESS
FULLY FROM JAPAN'S TANEGASHIMA
SPACE CENTER ON DEC. 13.

SeaWinds is on its way



NASDA / h_jia_018_hi.jpg

SeaWinds launches
from Japan's
Tanegashima Space
Center on Dec. 13.

The instrument joins another satellite already in orbit to measure wind speed and direction over Earth's oceans.

SeaWinds, which rides aboard the National Space Development Agency of Japan's Advanced Earth Observing Satellite 2 (Adeos 2) spacecraft, will complement and eventually replace a second, identical instrument that has been orbiting since June 1999 aboard NASA's Quick Scatterometer (QuikScat) satellite. Its three- to five-year mission will augment a long-term ocean surface wind data series that began in 1996 with the launch of the NASA Scatterometer aboard the Adeos spacecraft. The Japanese Space Agency is a partner on SeaWinds, along with the National Oceanic and Atmospheric Administration (NOAA).

Climatologists, meteorologists and oceanographers use these detailed snapshots of ocean winds in conjunction with data from other Earth-monitoring satellites from NASA and other U.S. and international entities to understand and predict severe weather patterns, climate change and global weather abnormalities like El Niño.

SeaWinds on Adeos 2 will maintain a circular, near-polar orbit about 800 kilometers (500 miles) above Earth. Initial telemetry reports received by the Adeos 2 team show the spacecraft to be in excellent health. The SeaWinds instrument will be powered on 27 days after launch and 17 days later will undergo a thorough checkout. A six-month calibration/validation phase will begin in mid April, with nominal science operations scheduled to begin in October 2003.

"Winds effectively 'stir' heat, moisture and greenhouse gases interacting between Earth's oceans and atmosphere, driving ocean circulation and ultimately weather and climate," said Dr. Ghassem Asrar, associate administrator of NASA's Office of Earth Science. "Ground-based methods of monitoring winds using ships and buoys can only provide a glimpse of this picture, whereas space-based microwave radars like SeaWinds can continuously and accurately map wind speed and direction under most weather conditions across 90 percent of Earth's ice-free oceans every two days.

"In addition," Asrar said, "since SeaWinds maps Earth's land masses as well as its oceans, its data are being used in an increasing number of other applications, from production of daily maps of sea ice extent around Earth's poles; to measuring soil moisture content, vegetation and snow cover; to detecting regional flooding."

"With its ability to 'see' ocean level winds through clouds, data from SeaWinds on Adeos 2 will be an invaluable tool for hurricane tracking and high seas marine forecasting," said Helen Wood, director of NOAA's Office of Satellite Data Processing and Distribution. "NOAA will quickly process the data for weather forecasting use by NOAA's National Weather Service, the Japanese Meteorological Agency, and other national weather agencies around the world."

Scatterometers operate by transmitting high-frequency microwave pulses to the ocean surface and measuring the "backscattered," or echoed, radar pulses bounced back to the satellite. The instrument senses ripples caused by winds near the ocean's surface, from which scientists can compute wind speed and direction.

Additional information about SeaWinds is available at <http://winds.jpl.nasa.gov>.

JPL 101 quiz will test your knowledge

Q: Where is the Carl Sagan Memorial Station?

a) Ares Vallis, Mars
b) JPL Mall Wall
c) Aboard the Voyager spacecraft
d) 65 N. Catalina Avenue, Pasadena
(Answer below)

How much do you really know about the people, endeavors and events that have shaped the history of the Laboratory? A new and fun way to find that out will make its online debut on Monday, Jan. 13.

"JPL 101" will be featured on the Lab's internal news site, the Daily Planet (<http://daily-planet>), and will include a new five-question quiz every week.

The questions and answers in JPL 101 represent information that challenges the seasoned JPLer, while informing the new hire. The Q & A's cover a broad array of information and are intended to help people gain understanding about areas where they may not have direct work-related exposure. The questions are in seven categories: JPL Basics, Science, Technology, Product Development, Missions, Stakeholders, and JPL History.

The answers contain supplemental information that encourage further exploration of JPL resources. The quiz is intended as a general educational resource for the use of all Lab-oratory personnel. People are encouraged to share their knowledge by submitting questions and answers for inclusion in future quizzes.

The JPL 101 Quiz was developed by the Knowledge Capture Team through the ICIS Knowledge Management Program, with the assistance of the Internal Communications Office, JPL Library, Human Resources, and Ethics Offices. For more information, contact Rebecca Nash, ext. 4-1752, or Lynne Cooper, 3-3080.

A: a) Ares Vallis, Mars.
The Pathfinder Lander was formally named the Carl Sagan Memorial Station following the successful touchdown in the Ares Vallis region on Mars.

Four JPL Earth science concepts funded

Artist's rendering depicts the
Rapid-Repeat Deformation
Measurement Capability
for the NASA AIRSAR System.

Four JPL-led investigations are among the nine awarded funding by NASA last month for technology development of innovative Earth science remote-sensing instruments, under the Instrument Incubator Program, to support the mission to understand and protect our home planet.

Investigations led by JPL researchers Scott Hensley (Rapid-Repeat Deformation Measurement Capability for the NASA AIRSAR System), Ziad Hussein (Cryospheric Advanced Sensor: A Spaceborne Microwave Sensor for Sea Ice Thickness and Snow Cover Characteristics), Eastwood Im (Next Generation Weather Radar [NEXRAD] In Space—A Radar for Monitoring Hurricanes from Geostationary Orbit) and Bjorn Lambrigtsen (Prototype Geostationary Synthetic Thinned-Aperture Radiometer) have been funded for further development.

The main purpose of the Instrument Incubator Program is to invest in research and development of new and innovative technologies to support the NASA Earth Science Enterprise goals and objectives. The program focuses on creating mature technologies leading to smaller, less resource-intensive and less expensive flight instruments that can be built quickly and efficiently.

The nine selected proposals focus on high-priority measurement areas of Earth's coastal region; Earth's interior processes and motions; sea-ice thickness and snow cover; pollution effects; and precipitation, evaporation and cycling of water. A proposal also focused on innovative technologies supporting measurement concepts from the L1 or L2 Lagrangian points (the points in space where the opposing pull of the Earth reduces the effective pull of the Sun; L1 being on the sun-facing side of Earth and L2 on the opposite or dark side of the Earth).

The total funding for the nine selected investigations, over a period of three years, is approximately \$22 million.

For the other investigations selected for the Instrument "Incubator Program, log on to <http://esto.gsfc.nasa.gov/programs/iip>.



Image courtesy of Scott Hensley

J P L C E L E B R A T E D

2002

the 40th anniversary of planetary exploration as well as the 25th anniversaries of the launches of Voyagers 1 and 2. It's much busier now—the year ended with a record 14 spacecraft in orbit throughout the solar system. And there's much more to come, as the Laboratory looks forward to the busiest period in its history over the next couple of years.

JANUARY

JPL astronomers gathered evidence that a shock is created when material falls in toward a dust disk around a growing star. Scientists believe dust particles in these disks clump together, leading to small rocks that can join together to form planets and comets. ... The Galileo spacecraft flew past Jovian moon Io on Jan. 17, the mission's last and closest flyby of any of Jupiter's four major moons. ... In a partnership with Norway, JPL researchers demonstrated the design of an ice-penetrating robot on a glacier far above the Arctic Circle. The probe melted down 23 meters (75 feet), establishing the viability of subsurface exploration. ... The Mars Odyssey spacecraft was raised up out of the atmosphere to conclude the aerobraking phase of the mission on Jan. 11. ... Using data from the SeaWinds instrument on the Quick Scatterometer (Quikscat), researchers dramatically improved the warning time for tropical cyclone development in the Atlantic and Eastern Pacific hurricane basins. ... Newly appointed NASA Administrator Sean O'Keefe paid his first visit to the Laboratory on Jan. 30 (*above*).



FEBRUARY

Mars Global Surveyor continued to shoot stunning pictures (*left*) as it began the second extension of its successful mission. ... Scientists began studying winter snow packs on the Colorado side of the Rocky Mountains. This will improve the estimation of snow amount and forecasting of spring flooding due to snowmelt, and study the

role of cold lands within Earth's climate. ... Scientists using a combination of data from Galileo and Cassini discovered an invisible whirling bubble of charged particles—the magnetosphere—surrounding Jupiter. ... The United States and Europe incorporated wind speed and direction data from QuikScat into their global weather analysis and forecast systems. Forecasters can now predict hazardous weather events over the oceans as much as six to 12 hours earlier. ... Mars Odyssey began its mapping mission. Initial measurements by the gamma ray spectrometer suite showed significant amounts of hydrogen in the south polar region.

MARCH

The JPL-managed Gravity Recovery and Climate Experiment (Grace), a five-year mission to precisely measure the planet's shifting water masses and map their effects on Earth's gravity field, launched March 17 from Russia (*right*). NASA's partner is the German Space Agency. ... Wind data obtained by QuikScat documented episodes of reversed trade winds that are responsible for unseasonable cyclone conditions in the northwest and southwest Pacific, and which may be a precursor of a future El Niño. ... The New Millennium Program selected two organizations to lead the work on new technologies to control a space vehicle's flight path so the payload responds only to gravitational forces. The Disturbance Reduction System technology is scheduled to fly in 2006 as the Space Technology 7 project, designed to test and validate advanced technologies for future use on NASA missions.

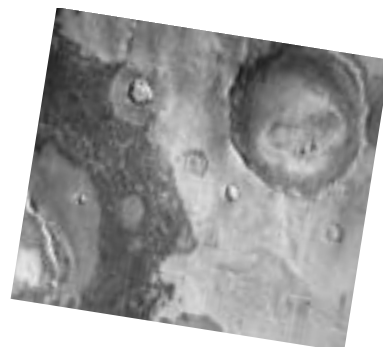


APRIL

Astronomers identified a potential close encounter with Earth by an asteroid two-thirds of a mile wide. What will most likely be a miss, even without preventive measures, will come in March 2880. ... The Voyager Interstellar Mission flight team activated a backup position-sensing system, including a Sun sensor and star tracker, on Voyager 1. The spacecraft had been carrying those components and other spare parts since it was launched in 1977 on what was then slated as a four-year mission. ... The JPL-managed Next Generation Sky Survey was one of four proposals selected by NASA as candidates for the Explorer Program of lower cost, highly focused, rapid-development scientific spacecraft. The mission would discover the brightest galaxy and the closest star to the Sun. ... A team of fuel cell experts designed a compact, flat fuel cell, resulting in a portable technology that may someday operate small, portable electronic devices for hours and even days at a time without recharging or using expensive, heavy batteries.

MAY

Aqua, carrying the JPL-managed Atmospheric Infrared Sounder (AIRS) instrument, launched May 4. The mission is dedicated to advancing our understanding of Earth's water cycle and our environment. ... A Washington, D.C. tribute honored JPL's 40-year legacy of exploring the planets and beyond. Attending were former Lab directors Drs. William Pickering, Ed Stone, Lew Allen and Bruce Murray, and JPL's current Director, Dr. Charles Elachi (*below*). ... A new, cost-effective technology based on the global positioning system (GPS) may soon revolutionize the way Earth's atmosphere is monitored. By measuring—to within a few trillionths of a second—the subtle changes in the time it takes for GPS signals to arrive at spacecraft as they travel through Earth's atmosphere, scientists can derive data that include extremely precise profiles of atmospheric density, pressure, temperature and moisture content. ... Final observations by Galileo of Jupiter's moon Io revealed 13 previously unknown active volcanoes, bringing the total number of known Ionian hot spots to 120. Galileo images revealed 74 of them. ... Scientists using Mars Odyssey's gamma ray



spectrometer instrument suite found enormous quantities of subsurface water ice in the upper meter (3 feet) of soil in a large region surrounding the planet's south pole (*top*). ... Infrared images by Odyssey showing Mars' layered surface are the first direct evidence that Mars experienced a series of environmental changes during active geological periods in its history.

JUNE

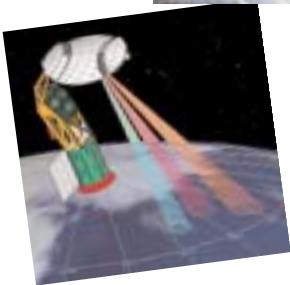
Thousands of acres of burned vegetation were revealed in images of Colorado's worst forest fire, taken by the Advanced Spaceborne Thermal Emission and Reflection Radiometer (Aster) onboard the Terra spacecraft. ... JPL hosted a briefing for industry in Pasadena, where more than 200 business leaders gathered to learn about potential business opportunities with the Lab.

JULY



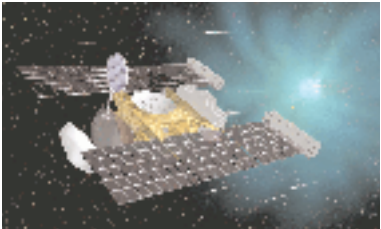
The Comet Nucleus Tour mission (*left*) launched July 3 on a 15-month journey to Comet Encke followed by a two-and-a-half-year trip to Comet Schwassmann-Wachmann 3. JPL will provide navigation and Deep Space Network support. ... QuikScat confirmed a 30-year-old, largely unproven theory that there are two areas near the equator

where the winds converge year after year and drive ocean circulation south of the equator. ... NASA selected two new missions that will be managed by JPL for the Earth System Science Pathfinder small-satellite program. The Orbiting Carbon Observatory (*right*) will generate knowledge needed to improve projections of future carbon dioxide levels within the atmosphere, while Aquarius (*bottom*) will provide the first-ever global maps of salt concentration on the ocean surface, a key area of scientific uncertainty in the oceans' capacity to store and transport heat, which affects Earth's climate and the water cycle. ... Researchers created the first four-band infrared focal camera, which will allow them to "see" details that were unachievable with previous technology. This will aid pollution detection, weather prediction and other vital atmospheric and geological applications on Earth. ... Consolidated Edison of New York signed a technology affiliates agreement with JPL to develop sensor technology to detect and quickly analyze hazardous materials in the field.



AUGUST

The JPL-managed Stardust mission (*below*) began to collect tiny interstellar dust grains on its mission to collect and return the first samples from a comet. ... Five JPL proposals were among those selected by NASA for the Earth Science Enterprise's Advanced Component Technology Program, which will provide core component and subsystem technology developments that will enable new science measurements and visionary concepts. ... Three principal investigators from JPL were among those chosen by NASA to develop technologies and other advanced propulsion ideas as part of a suite of in-space propulsion technologies, which will greatly increase NASA's capability to conduct future planetary missions, especially to the outer planets of Jupiter and beyond.



SEPTEMBER

JPL scientists confirmed the first known capture of an object into Earth orbit from a Sun-centered orbit, thanks to continuing observations of what was most likely the third stage of a 1969 rocket to the moon. ... Building upon more than a decade of work on a standard called the linear ion trap, JPL's Frequency Standards Laboratory team developed and installed a new trapped ion atomic clock for the U.S. Naval Observatory in Washington, DC. Recent JPL innovations are expected to provide 20 times improved stability over previous trapped ion clocks.

OCTOBER

The highest resolution mid-infrared picture ever taken of the center of our Milky Way galaxy revealed details about dust swirling into the black hole that dominates the region. The image (*right*) was taken by a team at the Keck II telescope in Hawaii with the JPL-built Mid-Infrared Large-Well Imager camera. ... The Oct. 4 opening of JPL's Commercialization Center created a one-stop shop for U.S. companies that would like to work with the Lab's Commercial Technology Program. ...



Using the NASA Global Differential GPS system at JPL, researchers demonstrated the ability to very precisely navigate airplanes in real time, anywhere in the world, independent of local navigational aids or infrastructure. This promises to extend precision navigation to infrastructure-poor areas of the world, potentially enhancing aviation safety in these areas. ... Researchers demonstrated a prototype device that automatically and continuously monitors the air for the presence of bacterial spores. The result is a novel alarm capability reminiscent of smoke detectors. ... Galileo imaged reddish spots on the icy surface of Jupiter's moon Europa, which may indicate pockets of warmer ice rising from below. This upwelling could provide an elevator ride to the surface for material in an ocean beneath the ice.

NOVEMBER

After 37 close encounters with various planets, asteroids and Jupiter's four large moons, Galileo dashed through Jupiter's inner radiation belts past the moon Amalthea (*below*) on Nov. 5, its last flyby before impacting the planet next September. ... The search for planets beyond our solar system received a major boost with the dedication of JPL's Optical

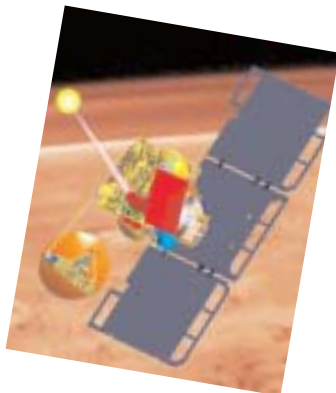


Interferometry Development Laboratory, Building 318 (*right*). ... A successful test of the camera on the Cassini spacecraft produced images of Saturn 20 months before the spacecraft arrives at that planet. The image shows the shadow of the planet falling across its rings and includes Saturn's largest moon, Titan. ... All systems on the Stardust spacecraft performed successfully when tested in a flyby of asteroid Annefrank, heightening anticipation for Stardust's encounter with its primary target, comet Wild 2, in late 2003.



DECEMBER

NASA selected four proposals for detailed study as candidates for the 2007 "Scout" mission in the Mars Exploration Program. The principal investigator leaders of the four selected by NASA chose JPL to be their project management partner. If any of the four proposals were to be selected for development, JPL would provide project systems engineering, mission assurance leadership, mission trajectory design and navigation, and mission operations leadership. (*Right: Proposed Mars Volcanic Emission and Life Scout*) ... JPL welcomed more than 20 members of the Mariner 2 team (*below*) to close out the year's 40th anniversary of planetary exploration. ... Japan's Advanced Earth Observing Satellite launched Dec. 13, carrying the JPL-developed SeaWinds instrument to monitor ocean winds.



Staff generous with donations

From left, JPL United Way campaign organizers Laurie Lincoln and Peter Poon chat with United Way representatives Frank Chimarusti and Mike Zoeller during a luncheon honoring the Lab's 215 campaigners and 18 steering committee members.



Photo by Dutch Slager / JPL Photolab

JPL staff members once again showed their generosity during the holiday season with an overall donation of \$447,619 in the 2002 United Way campaign. The 4,899 employees who donated funds represented an increase of 16 people from last year's campaign. Donations dropped about \$3,000 Labwide compared to 2001. By organization, 9X led the way with 75 percent participation. Employees in 6X had the highest average yearly gift per contributor, at \$362. Labwide, staff donated \$196 per contributor. JPLers were particularly generous during the food drive, giving enough canned goods to fill 132 boxes, 41 more than last year.

Passings

EUGENE RITTEL, 77, retired electronics technician in JPL's Digital Projects Group, died of cancer Nov. 10. Rittel worked at JPL from 1969-90, and is survived by his wife Shirley, four children, 14 grandchildren and nine great-grandchildren. Services were private.

MANUEL ESQUIVEL, 37, an electrical engineer in Section 333, died Dec. 1. Esquivel had worked at JPL since 1985. He is survived by his parents, three sisters, one brother, one godson, a nephew and a niece. Services were held Dec. 15 at Holy Family Catholic Church in Wilmington.

JOHN W. ANDERSON, 75, a retired engineer and technical writer, died Dec. 12. Anderson worked at the Lab from 1962-95. He is survived by his wife, Dorothy; sons John Jr. and Christopher; daughter Kathleen; their spouses and nine grandsons; his brothers, Norman and Arnold; and sisters Edna and Marlene. Memorial services were held Dec. 18 at Eternal Valley Memorial Park in Newhall. The family asks that in lieu of flowers, contributions may be made in Anderson's name to the American Lung Association.

DAVE FABRUADA, 65, a retired Electrical Engineer in the Facilities Engineering and Construction Section 6611, died Dec. 12 of kidney cancer. Fabruada worked at JPL from 1983-99. He is survived by his wife, Fregia, a son and a daughter. Services were held Dec. 21 at Azure Hills 7th Day Adventist Church in Loma Linda.

Letters

Thank you so much for the beautiful plant that was sent to my home due to the death of my mother. Your thoughtfulness meant a lot to me as I also lost my father this past March. However, each of my parents had accepted Jesus Christ as their personal savior, so I will see them once again in Heaven. Thanks again.

Robert Holt

Classifieds

For Sale

BOOTS, Lowe mountaineering, sz 12, \$10; crampons and insulators, \$10. 626/794-2431. CHAIN SAW, McCullough, 18" chain, newly tuned up, \$75. 790-6185, Tim, or tscheck1@mac.com COFFEE MAKERS, Krups 10-cup, white/gray, like new, \$40/obo; Braun 10-cup, white/black, like new, \$30/obo. 626/791-6101. COMPUTER, Power Mac 7100/80 with monitor, keyboard, mouse, and Global Village TelePort Platinum modem, works fine, \$50. 790-8523. DESK AND CHAIR, antique mahogany, \$950. 248-8853. DINETTE TABLE, 30" x 47", oak, w/2 cushioned oak chairs and 1 oak cushioned bench seat that seats 2, very good cond., \$250; INTELLIVISION CARTRIDGES, 8 orig., \$20/all. 626/359-7666. DRYER, electric, heavy-duty large capacity, good

cond., \$115. 648-4846, Mike. EXERCISE EQUIPMENT, NordicTrak cross country Achiever ski machine, early model, wood & steel, vg shape, in storage, handgrips turn TV on/off, VCR, orig. sold for \$1,400, sell \$125; PANTSUITS, 2, Susan Graver, velour tunic, size 1X, worn once, wine & gray, long, w/applique scroll on bottom, side pockets, elastic waist, \$15/each, \$25/both; other XL, 1X women's clothing. 246-3331. FIREPLACE SCREEN, black with brass trim, exc. cond., \$20. 626/445-2616. FURNITURE: ceramic lamps, 2 lg., dusty rose, \$25; oak desk & 2 matching bookcases, Spanish, \$700; mission golden oak sideboard w/mirror, \$1,200; mission library desk, \$400; office furn., Techline, white, 6 pc., \$500; hall table, drop leaf, \$200; butcher block utility table unfin., \$150; several mirrors, Nordic Track, \$50; 626/584-0860, or 626/794-3144, eve. FURNITURE: teal recliner, \$49; wicker peacock chair, \$29; oak coffee table, \$19; pink/gray stroller, \$19; microwave cart, solid oak, \$39; matching oak side table, \$19; bookcase, blue metal, sliding glass doors, 4' w x 3' t, \$89; hot/cold water dispenser, stand-alone model, \$29; doctor's scale, tall with balancing lever, \$49. 626/798-4510. MISC.: quilting frame, \$29; spare tire/wheel, donut, T105 80D-13, used once, \$39; Shiatsu massager, fits in chair, \$29; down comforter, king, \$49; mini-blinds, 72" w x 50" t, 2 for \$29; wireless doorbell/intercom, \$39; golf ball retriever, telescoping aluminum 12', \$19; rolling duffel bag, kids, multicolor, never used, \$19; 3-piece luggage set, Pierre Cardin, \$19. 626/798-4510. MODEMS, Arescom NetDSL DSL, for MSN DSL: 2 NetDSL 800, 1 NetDSL 1000, brand new in the original boxes with all cables, documentation, CDs, \$30/each. 769-8335. PIANO, upright, great cond., \$100/obo. 353-2772, after 5 p.m. POOL LADDER & light, stainless steel. 626/794-2431. REFRIGERATOR, Whirlpool, 18.2 cu. ft., freezer on top, white, auto icemaker, EZ-vue crispers, adjustable glass shelves, 2 yrs old, sacrifice \$350. 790-4028. SCANNER, brand new Memorex 48u, 48-bit true color flat bed scanner, 600 x 1200 dpi, compatible with Windows 98/2000/ME/XP, hot plug and play, \$29. 956-3745, Steve. SLED, green, exc. cond., was \$20, now \$10. 626/850-4378. TELEPHONE, antique Danish hand crank, near mint cond., no dial, can be converted as an extension phone, \$95/firm. 248-5282. TELESCOPE EQUIPMENT: Meade, 12" LX200, w/computer drive system; Apogee AP47P digital imaging system, TE cooled camera head, Gr. 1 Marconi 47-10 CCD & MaxIm DL/CCD image acquisition & processing software; Meade Super Wedge & Dew Shield, + add'l accessories, virtually unused, paid \$13K, sell for \$4,900 for telescope/accessories, \$4,900 for camera, or \$9,750 for all. 805/492-0576, Tony, or ts44@gte.net. TOYS/EQUIPMENT: Little Tikes Cozy Car w/canopy & removable push handle, was \$60, now \$30; Little Tikes Swing Along Climber w/swing, slide, and steering wheel, was \$120, now \$75; Safety 1st booster seat, was \$20, now \$10; ass't'd soft plush toys for car seats and strollers, were \$16/ea., now \$8/ea.; all in exc. cond. 626/850-4378. TREES: red banana plant, 5' tall, \$60/obo; Fish tail, 6', \$80/obo; ficus, braided, in 30" plastic pot, >10' tall, \$250/obo; ceramic bowl, gray, 2' diam. w/planted geraniums, \$40/obo. 626/791-6101. VANITY DRESSING TABLE, antique, mirror + 4 sm. drawers, Art Deco, circa 1930s, great cond., \$300; DRESSING TABLE, unique hony oak, ped-estal type, dual circular mirrors w/solid brass appointments, circa 1940s, must see, great cond. \$275. 368-9520.

Vehicles / Accessories '01 CHEVROLET Suburban, LT, 31K mi., all leath-er, pwr. seats, dual air, lift gate, loaded, pewter w/gray interior, \$28,000/obo. 626/339-5511. '99 FORD Taurus, V6, 3.0, beautiful cond., white/light gray interior, \$4,700. 626/379-3503, Erik. '98 FORD Crown Victoria LX, 4.6L V8, 4 door, white/beige, leather, CD, keyless entry (remote and keypad), cruise, power everything, 100K mi., split front seats, good cond., \$12,500. 822-6465, Ryan or code3media@crownvic.net. '98 FORD Taurus, V6, 3.0, blue, 75,000 mi., great cond., \$4,500. 626/379-3503, Erik. '98 FORD Contour, auto, air, CC, pwr. locks/ windows, folding rear seat, good tires, newer timing belt, runs well, white with light gray interior, 74K mi., \$4,100. 626/447-5433. '93 FORD Explorer, white/tan, clean, one owner, great cond., 103K mi., \$4,800/obo. 790-7366. '68 FORD Mustang, hard top, 289 V8, auto, fac.

a/c, p/s, am radio, orig. owner, orig. candy apple red paint, mint cond., runs great, Calif. car, no rust, owners manual, fac. invoice, window sticker and sales brochure, \$10,000. 248-6489. '68 FORD Mustang, Classic Calif. Special GT/CS, hi-perf. 302 cid, 75K orig. mi., auto, fac. a/c, p/s, am radio, metallic gold paint, black interior, GT hood, trunk, fogs and wheels, no rust, manuals, turns heads, \$13,250/obo. 626/963-5727. '99 HONDA LX edition, intense silver, sold by orig. owner, clean, exc. cond., auto power, CD/cass., 82K mi., well maint., \$10,965/obo. 257-2997, Vic. '97 HONDA Civic EX coupe 2 dr., 4 cyl., 1.6L VTEC, 5 spd. manual, 113,000 mi., p/w, p/L CD, keyless entry, runs/looks great, \$6,000. 626/482-8836. '97 HONDA Valkyrie motorcycle, exc. cond., extra chrome, garage kept, purple/white, leather bags, 23K mi., see to appreciate, \$8,000. 957-2852. '95 HONDA Accord EX, 4 dr., 92K mi., VTEC, a/c, moonroof, full pwr., gd cond., \$7,500. 353-2103. '95 HONDA DX coupe, black, 110K mi., 6-speaker audio syst., a/c, exc. cond, \$3,200. 626/296-0844. '84 HONDA Sabre VF7005, 700 cc, 18,000 mi., black, rear rack, windshield, helmet, good cond., \$1,600. 626/794-2431. '99 KAWASAKI Vulcan 1500 motorcycle, classic cruiser, 17,000 mi., Mustang seats, luggage rack, Cobra floor bds, Vance & Hines exhaust, extended warranty, \$6,600. 626/441-2150. Å85 KOUNTRY Lite 5th wheel trailer, 30', orig. owner, alum. frame, 13.5K mi., a/c, side bath, microwave, TV/VCP avail, new tires & water pump, slps. 6, exc. cond., renewed lic.-Mar. \$6,500/obo. 626/963-5727. '90 MERCEDES 300E sedan, 58K orig. mi., 1 owner, black w/gray leather interior, immac. cond., must see, \$11,000/obo. 626/339-5511, Bill. '00 SATURN SLC, 47,000 mi., all pwr., compact disc, auto, warranty, \$9,800/obo. 661/252-8027. '94 SATURN SL2, 4 dr., pwr. locks/windows, alarm, smog checked March '02, new tires & battery, exc. cond., well maint., like new, white, 24/32 mpg, 105KM, \$4,200/obo. taguhi@yahoo.com or 726-7701. '94 SATURN SL2 sedan, 4 dr., 4 cyl., 1.9L, DOHC, 5 spd. manual, front wheel drive, 135,000, a/c, pwr. steering, tilt wheel, am/fm stereo/cass., driver airbag, ABS (4-whl), \$3,000. 626/798-2097. '99 TOYOTA Solara SLE, V6, auto, 2 dr., black interior/ext., sunroof, spoiler, fog lights, leather bucket seats, pwr. seats, a/c, am/fm stereo/cassette/CD, power windows/locks/mirrors, cruise control, tilt whl, driver + passenger air bags, anti-lock brakes, 90K mi., exc. cond., \$9,800. 626/780-2427. '97 TOYOTA 4Runner, Desert Dune, 114K, 4 cyl., 2.7L, a/c, pwr. steering/windows/locks, roof rack, tow pkg., am/fm/cassette, dual front airbag, privacy glass, cruise control, \$8,700. 626/798-2097. '92 TOYOTA Camry wagon, loaded, a/c, roof rack, good cond., runs great, single mother discount, \$3,100/obo. 626/304-2686. '83 TOTOTA Supra, 5 spd. manual, less than 30K mi. on rebuilt eng., new tires, exc. exterior/interior, shiny orig. paint, red/black, reliable, \$2,100. 957-2852. '01 VW Beetle GLS, silver/black leatherette, 5 spd., pwr. locks/windows/mirrors, cruise, alloys, AM/FM cass., CD changer, fog lights, ABS, remote keyless entry, 11.9K mi., \$15,500. 626/449-0997. '95 VOLVO, 850 GLT wagon, 92,000 mi., exc. cond., \$9,500. 248-8853. '92 VOLVO 940 Turbo, 96K mi., very well maint., leather int'r., new tires, booster seat, heated front seats, registr. pd. 9/02, \$6,500/obo. 548-3442.

Wanted

SKI EQUIPMENT, children's size, 11.5 or 12.5 boots, downhill skis, bindings and helmets, for 4-6 yr. olds. 720-8455. COMPUTER/PRINTER, donated to local feral cat spay/neuter non-profit org. 626/792-8272, Alex. reverb2020@yahoo.com. MUSICIANS, for jamming, rock, blues, progressive, garage, whatever. reverb2020@yahoo.com. SPACE INFO/memorabilia from U.S. & other countries, past & present. 790-8523, Marc Rayman.

Free

CLEAN FILL DIRT, 30 cu. yds. avail., you haul as little or as much as you like, near Los Robles/Jackson, Pasadena. 626/791-3103. DOG, 11-year-old Terrier mix losing its home due to divorce; needs a vg home, someone who will love/spend time w/him, TLC; has been alone very much of the time, loves to play ball, not good w/children, action needed ASAP. 626/359-3516.

Lost & Found

Lost: KEYS, 2 keys on ring, 1 w/green rubber around it, 1" angel charm. Ext. 3-4050, Wendy.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meeting Jan. 9 at noon in Building 167-111 (The Wellness Place). Normally, the group meets the first Thursday of the month. For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first and third Fridays of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Monday, January 6

JPL Toastmasters Club—A joint meeting with the Advanced Communication Training and Leadership Speakers Bureau of Pasadena will be held at 6 p.m. in the 167 conference room. Five speakers will be featured.

Tuesday, January 7

JPL Gamers Club—Meeting at noon in Building 301-227.

JPL Genealogy Club—Meeting at noon in Building 301-271.

Tues. -Wed., Jan. 7-8

Investment Advice—TIAA/CREF representatives will be available for one-on-one counseling. For an appointment, call (877) 209-3140, ext. 2614.

Wednesday, January 8

JPL Amateur Radio Club—Meeting at noon in Building 238-543.

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Roger Carlson at ext. 4-2295.

For Rent

GLENDALE, furn. room in charming Span.-style home, quiet, lovely residential area, ~15 min./JPL, private ba., shared kitchen/washer/dryer, no smoking, no pets, \$525 incl. util. 545-0455. LA CANADA, private rm. in home, with private bath, off-street parking, BBQ, pool, full kitchen priv., wash/dry, etc. \$450+ utilities. 790-1280. LA CRESCENTIA, above Foothill, 2 bd., 1 ba., stove, hardwood floors, W/D hook-ups, \$1,595. 248-0190, Nita. LA CRESCENTIA, newer home, 3 bd., 2 ba., 2-car detached garage, F/P, patio, washer/dryer, water included, fenced back yard, quiet street, lovely neighborhood, \$2,200. 249-2990. PASADENA cottage, 1 bd., 1.5 ba., hardwood floors, one-story, garden, near Eaton Cyn., gas stove, fridge, window A/C, cable-ready, private washer/dryer, garage, 6 mi. from JPL, owner pays water, trash, maintains grounds, no dogs, other pets negotiable, nonsmokers only, credit and references checked, \$885 + \$1,500 security. 626/794-1841, Claire Marie-Peterson. PASADENA, front house, completely remodeled, walk to Rose Bowl, 5 min. to JPL, 3 bd., 2 ba., includes, stove, refrigerator, washer/dryer, 2-car parking, private yard, gardener, \$1,850. 626/794-8517, Art. PASADENA, fully furn. 2 bd., 1.5 ba., townhome style apt. w/patio, laundry facilities, parking, nr. Caltech & JPL, \$1,295; PASADENA, furn. 2 bd., 1.5 ba. apt. to share in same bldg., \$625. 626/351-9641. PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright ktch., prof. landscape, ctrl. air & heat, close to shop., cozy 1/2 with t/p, end unit, frml. d/r, hdwd. flrs., immac. cond., close to schls, \$1,750. 626/396-9024. PASADENA, apt. to share, 2 bd., 2 ba., + loft in luxury security complex near Colorado/Lake, living room, loft & kitchen fully furn., DSL/ balcony/pool/Jacuzzi/gym, \$750. 626/644-5431. SHERMAN OAKS, Fashion Square area, 3 bd., 2 ba., den, 2-car garage w/storage room, large yard,1 block north of shopping center, \$2,200. 626/791-0585, evenings, Ulvi or Ayse. SIERRA MADRE townhouse-style apt. to share, 1,000 sq. ft. apt, large patio, 2 bd., 1.5 bath, quiet street, garage parking, washer and dryer for this unit, \$615 plus 1/2 utilities. 626/355-4838.

Thursday, January 9

Investment Advice—Fidelity representatives will be available for one-on-one counseling. For an appointment, call (800) 642-7131.

Friday, January 10

Folk Music—Renowned Scottish folk singer Jean Redpath will join Ensemble Galilei in concert at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$25, \$21 and \$17. For more information, call (626) 395-4652.

"Systems Engineering and Theme Park Development"—Ken Salter of Walt Disney Imagineering will speak at 11:30 a.m. in von Kármán Auditorium. The talk is presented by the Center for Space Mission Architecture and Design.

Tuesday, January 14

JPL Stamp Club—Meeting at noon in Building 183-328.

Mr. Deeds Goes to Town—A part of Caltech's Frank Capra Film Festival, this classic will be shown at 7:30 p.m. in Beckman Auditorium. A panel discussion will immediately follow the screening. Free admission. Call (626) 395-4652.

Wednesday, January 15

"Superconductivity: Resistance is Futile"—Caltech physics professor Dr. Nai-Chang Yeh will deliver this free lecture at 8 p.m. in Beckman Auditorium. For more information, call (626) 395-4652.

Thursday, January 16

Social Security—A representative will be available for one-on-one counseling. For an appointment, call the Benefits Office, ext. 4-3760.

Friday, January 17

Caltech Folk Music Society—Singer-songwriter David Massengill will appear at 8 p.m. in Dabney Lounge. Tickets are \$15 for adults, \$5 for children under 12. Call (626) 395-4652 or visit <http://www.folkmusic.caltech.edu>.

Michael Crichton—The renowned author will deliver a free lecture at 8 p.m. in Beckman Auditorium. For information, call (626) 395-4652.

W. TOLUCA LAKE, 1 bd., 1 ba., very pvt. guest house, warm & cozy, quiet, friendly st., unfmrshd, lvg rm/ktchn, pvt. patio, pvt. yard, a/c, stove/refrig/ sep lndry rm. w/washr/dryer, encl. gar., cat(s) OK, no-smokg pls, \$950, incl. all utils. 980-1638.

Real Estate

VALENCIA condo, 2 bd., 2 ba., 1,074 sq. ft., vaulted ceilings, skylight, fireplace, w&d in unit, pool, spa & more; virtual tour at www.helpusellscv.com, \$219,900. 661/260-1603.

Vacation Rentals

BALBOA ISLAND, fully furnished 2 bd., 1 ba., patio, washer/dryer, parking, steps to bay, \$150/night or \$875/week. 626/351-9641. BIG BEAR LAKEFRONT, luxury town home, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548. CAMBRIA, ocean front house, sleeps up to 4, exc. view. 248-8853. COSTA RICA, Pueblo Real, Quepos, 2 bd., 2 ba., condo, fully equipped kitchen, TV, VCR, sleeps 6, air, newly remodeled, large pool, tennis, typical restaurant, near Manuel Antonio, next to river w/mangroves and monkeys, close to beach, JPL rates. luisalfaro@earthlink.net or 760/723-8522. HAWAII, Maui condo, NW coast, ocean front vw., 25 ft. fr. surf, 1 bd. w/loft, compl. furn. phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps 4, laundry fac.; low season rate \$105/nite/2, high season \$120/nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net. MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equipped kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc. 626/798-9222 or 626/794-0455. NEW SMYRNA BEACH, FL., condo, fully furn., 2 bd., 2 ba., fireplace, full kitch., quiet, relaxing, beautiful beach setting overlooking ocean, w/BBQ, pool, spa, game room; easy walk to restaurants, 1/2 hour to KSC, sleeps 6, avail. monthly. 909/981-7492, Darlene or dfhauge@yahoo.com. OCEANSIDE, on the sand, charming 1 bd. condo, panoramic view, walk to pier & harbor, pool/spa, game rm., sleeps 4. 949/786-6548. ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.